

REMARKS

The outstanding Official Action and art cited have been reviewed.

Claim Amendments

Correcting amendments have been made to the dependency of claim 21 and to the description of the circuit connections described in claim 24.

The Rejection of all Claims 1 - 35 on Kurokawa et al. or Kurokawa et al. and Murphy et al.

The rejection of claims 1 - 35 over the Kurokawa et al. article and/or the Murphy et al. article is respectfully traversed.

Independent apparatus claims 1, 2, 6, 9, 25, 28, 34 and 35 are directed to an oscillatory neural network computer including a "weighting network having phase-based connection strengths." Independent apparatus claims 11, 12, 13 and 17 for an oscillatory neural network computer with inter alia "a plurality of connectors" each having "a phase-encoded connection coefficient." Independent method claim 20 is directed to a method for programming a neural network computer that includes "encoding connection coefficients ... in accordance with phase relationships of signals representing a pattern to be learned." Since neither Kurokawa et al. nor Murphy et al. teach phase-based connection strengths in a weighting network, phase-encoded connection coefficients of connectors, or the step of encoding connection coefficient in a neural network computer in accordance with phase relationships, these claims cannot correctly be rejected as anticipated by Kurokawa et al. under 35 U.S.C. § 102(b) or as obvious over the combination of Kurokawa et al. and Murphy et al. To anticipate under 35 U.S.C. 102, a reference must meet every limitation of a claim. Similarly, under 35 U.S.C. § 103, a combination of two references cannot be obviously combined to provide that which is present in neither.

Dependent method claim 19 similarly is patentable over the two relied-upon writings in calling for "encoding coefficients of the neural network computer in accordance with phase representation of the signals representing a learned pattern."

The claims dependent from the above-mentioned independent claims are patentable by their inclusion by dependence of the terms quoted above. These are the dependent claims 2 - 5, 7, 8, 10, 14 - 16, 21 - 24, 26, 27, 29 and 30.

Independent method claim 18 calls for a method of recognizing an incoming pattern using a neural network computer "using a phase deviation between signals representing a learned pattern and signals representing the incoming pattern to create an output signal indicative of the learned pattern." Neither of the two cited articles speaks of the use of a phase deviation between signals representing a learned pattern. Consequently the two articles, Kurokawa et al. and Murphy et al., neither anticipate or make obvious the invention as claimed in claim 18.

Dependent claims 19 - 24 are allowable on the further basis that they include by their dependency the content of claim 18 not met by the relied-upon two articles individually or combined.

Independent claim 31 is an apparatus claim to an oscillatory neural network computer comprising "n phase-locked loops" and a plurality of "n" weighting circuits operably connecting an output of each of the phase-locked loops to each of ...n adder circuits" to which "n initialization input terminals" are connected as well. That structure is not to be found anywhere in the Kurokawa et al. and Murphy et al. writings and this claim is patentable over those two writings taken individually or combined.

The dependent apparatus claims 32 and 33 include by their dependency the structure discussed above in relation to the independent claim 31 and for that reason are patentable over Kurokawa et al. and Murphy et al.

In addition to the structure or steps that the dependent claims in this application incorporate by their dependency as discussed above, these claims are replete with structural limitations and method steps nowhere suggested in any art of record including Kurokawa et al. and Murphy et al. However these additional distinguishing features of the dependent claims do not need to be discussed here in detail inasmuch as each dependent claim includes by its dependency structure or steps not taught in the art relied upon in the outstanding rejection as discussed.

The mention in the title to paragraph 5 on page 2 of the Official Action of "Product by Process" and the statement that "applicant has disclosed a product (oscillatory neural network) produced from a process of incorporating various weighted networks, phase-locked loop circuits,

and supporting circuits," followed by the citation of *In re Brown*, 459 F. 2d 531, 535 (CCPA 1972) have been noted but are not understood as *Brown* relates to product by process claims. In this application there are no product by process claims. Claims 1 - 17 and 25 - 35 are apparatus claims and claims 18 - 24 are method claims.

The *Brown* case relates to the manner of examining product by process claims as compared to method claims and its relevance here is not seen. It is noted that the outstanding Official Action does not actually say that any of the claims are understood to be product by process claims, but only that the application discloses a product, an oscillatory neural network, made by a process, of bringing together its component parts. Of course that can be said of any circuit, but it is the structure of a claim that either does nor does not make the claim a product by process claim. And here none of the claims are so structured.

Newly presented claims 36 - 39 add the distinguishing limitation of the phase-based weighting referred to in the parent claims being representative of a plurality of patterns to be recognized and/or distinguished among. This also is not taught by Kurokawa et al. and Murphy et al.

Neither of the relied-upon writings deals with an oscillatory neural network computer that can learn more than one memorized pattern, whereas the present invention deals with such a computer. It can act, essentially, as an associative memory that can learn a number of patterns, not just one. These patterns are "remembered" together, at the same time. This is exemplified by the three patterns 0, 1 and 2 of Fig. 3 which, in the exemplary embodiment, applicants' oscillatory neural network computer learns and distinguishes. To recognize a noisy pattern, the network of the present application is started with the initial condition corresponding to the noisy pattern (as e.g. at Fig. 4) and let run until it converges to the previously learned pattern that is closest to the pattern, i.e., resembles the noisy pattern to a sufficient degree. The network is said to "recognize" the noisy pattern.

In the preferred exemplary embodiment described in this application, the mechanism of an associative memory is based on the synchronization of oscillators. Each memorized pattern corresponds to a globally synchronized state where patterns have different synchronized states with phase relationships. Thus, the system can have many learned patterns. Each has a unique pattern of phase relationships corresponding to the memorized pattern.

Kurokawa et al. present a network that is designed to have one and only one globally synchronized state where all neurons oscillate with the same phases, called "zero phase" or "in-phase" synchronization. Such a network cannot serve as "an associative memory," or means for recognizing and distinguishing among multiple patterns, because all initial conditions, corresponding to different patterns to be recognized, would lead to the same synchronized state. That is, this model cannot tell the difference between any two patterns, no matter how different they are. In other words, the Kurokawa et al. model has a synchronization property which precludes it from having any associative memory.

The Murphy et al. model does not deal with pattern recognition either. It deals with temporal pattern segmentation (as explicitly stated in the abstract). For any input pattern, the network reconfigures itself (through some modification of connection weights among adjacent oscillators) so that different disjoint features of the pattern oscillate with different phases. This is a purely image pre-processing technique that allows to tell whether an image consists of one, two or more disjoint parts. It does not tell what the image is.

The Murphy et al. model does not have associative memory that can recognize and distinguish patterns it has "memorized" because it does not have multiple attractors - the learned patterns it can associate with a fresh series of inputs. In fact, it does not have attractors of this kind at all. Oscillators in the Murphy et al. model synchronize or desynchronize depending on the current pattern to be segmented. Any new pattern wipes out the information stored in the weights from the previous pattern, so no memory is retained.

The writings of Kurokawa et al. and Murphy et al. do not, individually or combined, provide an oscillatory neural network computer that acts as an associative memory where different synchronized states (with different phases) correspond to different memorized patterns. The two relied-upon papers do not even discuss such a possibility because creating such an oscillatory associative memory is not possible with the simple architectures presented in the papers. There is no capability to learn, recognize and discriminate among multiple patterns.

It is requested that, if the rejection of any claims over Kurokawa et al. or Kurokawa et al. and Murphy et al. is continued, it be made clear whether the single Kurokawa et al. article is being relied upon under 35 U.S.C. § 102 or whether the combination of articles is being relied upon under 35 U.S.C. § 103. Also it is respectfully requested that if the outstanding rejection is

continued as to any claims, each of the limitations of the claims be considered and it be said how the two writings meet or teach those limitations.

Failure to Withdraw the Improper Claim Interpretations

Reconsideration is requested of the examiner's denial of applicants' request to withdraw the claim interpretations that inappropriately read into the claims features of the exemplary preferred embodiment of the specification. The claim interpretations gratuitously expressed in the "Supplemental Reasons for Allowance" issued after allowance of this application and payment of the issue are contrary to the Patent and trademark Office's long standing and court approved practice of giving a claim its broadest reasonable interpretation. M.P.E.P. § 2111.01 reads in part:

While the claims of issued patents are interpreted in light of the specification, prosecution history, prior art and other claims, this is not the mode of claim interpretation to be applied during examination. During examination, the claims must be interpreted as broadly as their terms reasonably allow. *In re American Academy of Science Tech Center*, 367 F.3d 1359, 1369, 70 USPQ2d 1827, 1834 (Fed. Cir. 2004) (The USPTO uses a different standard for construing claims than that used by district courts; during examination the USPTO must give claims their broadest reasonable interpretation). (Original emphasis.)

Also it is noted that in the outstanding Official Action the claim interpretations of the Supplemental Reasons for Allowance were not used. Never once is either relied-upon reference compared to the various specific specification feature read into the claims in the Supplemental Reasons for Allowance. The M.P.E.P., at §2111.01, further makes clear that in nonchemical applications such as the present, the claims are not to be interpreted, as was done here, as limited to the preferred embodiment described in the specification:

One must bear in mind that, especially in nonchemical cases, the words in a claim are generally not limited in their meaning by what is shown or disclosed in the specification. See, e.g., *Liebel-Flarsheim Co. v. Medrad Inc.*, 358 F.3d 898, 906, 69 USPQ2d 1801, 1807 (Fed. Cir. 2004) (discussing recent cases wherein the court expressly rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment).

That elements from the disclosure are not to be read into the claims is another long standing and court approved practice of the Patent and Trademark Office as well. See again M.P.E.P. § 2111.01, discussing binding federal appellate cases on this point:

In re Vogel, 422 F.2d 438, 441, 164 USPQ 619, 622 (CCPA 1970). See also *Superguide Corp. v. DirecTV Enterprises, Inc.*, 358 F.3d 870, 875, 69 USPQ2d 1865, 1868 (Fed. Circ. 2004) ("Though understanding the claim language may be aided by explanations contained in the written description, it is important not to import into a claim limitations that are not part of the claim. For example, a particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment."); *E-Pass Techs., Inc. v. 3Com Corp.*, 343 F.3d 1864, 1369, 67 USPQ2d 1947, 1950 (Fed. Cir. 2003) ("Interpretation of descriptive statements in a patent's written description is a difficult task, as an inherent tension exists as to whether a statement is a clear lexicographic definition or a description of a preferred embodiment. The problem is to interpret claims 'in view of the specification' without unnecessarily importing limitations from the specification into the claims.").

The withdrawal of the uncalled-for rewriting of the applicants' claims in the "Supplemental Reasons for Allowance" is important to enforcement of any patent that issues on this application as it may influence a court's interpretation of claims making them unduly narrow and thereby denying the applicants of the protection to which they are entitled.

Regardless of the rule amendment cancelling the admonition against using an application's abstract to interpret a claim, it is nevertheless improper to read into a claim a specific feature from the abstract just as from anywhere in the specification. The abstract is an abstract of the disclosure; it does not deal with the claims.

It is important and therefore requested that the unduly narrow claim construction that was applied in the Supplemental Reasons for Allowance be withdrawn, that the claims be interpreted and examined in compliance with the Patent and Trademark Office's long-settled and consistently applied practice of construing a claim based on its broadest reasonable construction.

Applicants request a two month extension of time for response to the outstanding Official Action through and including August 17, 2006. A check in the amount of \$225 covering the fee for the extension is enclosed. No further fee is believed required, however, authorization is given to charge any additional fees associated with this communication to Deposit Account No. 070135. A duplicate copy of this sheet is enclosed.

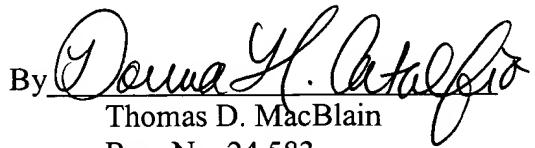
Any questions or suggestions regarding the application or the amended claims submitted herewith should be directed to the undersigned attorneys for applicant at the telephone number listed below or by email to the email address listed below.

Respectfully submitted,

GALLAGHER & KENNEDY, P.A.

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By


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